

China Science & Technology NEWSLETTER

Department of International Cooperation Ministry of Science and Technology(MOST), P.R.China

No.14

August.1 2017

China's High-Tech Development Zones and Industries

- ▶ Advances in high-tech development zones
- ▶ Overall performance of China's high-tech industry

Sponsor: Department of International Cooperation, Ministry of Science and Technology(MOST), P.R.China

Organizer: China Association for International Science and Technology Cooperation

Add: Room 1059 , Office Building , 11 B Fuxing Road , Beijing , P.R.China 100038

E-mail: caistc@126.com



China's High-Tech Development Zones and Industries

Advances in high-tech development zones

The establishment of "new and high-tech development zones" (hereinafter referred to as "high-tech zone") is an important part of China's science and technology policy. It is a key initiative to stimulate the development of high-tech industry through attention and support to the high-tech enterprises. During the 12th Five-Year Plan, the national high-tech zones maintain a good momentum of development, play a symbolic role in leading the implementation of innovation-driven development strategy, and boast fastest growth in China's high-tech industries. In recent years, with high-tech zones as their development basis, Beijing, Shanghai, Wuhan, Xi'an, Chengdu and other places have become National Independent Innovation Demonstration Zones. National Independent Innovation Demonstration Zone has become a banner to facilitate fast social-economic development through independent innovation with Chinese characteristics.

According to reports, in 2015, 146 national high-tech zones which have been taken into statistics, registered a total revenue of 25.37 trillion yuan. During the 12th Five-Year Plan, high-tech zones achieved an average annual growth of 17.4%, net profit of 1.6 trillion yuan, paid-in tax of 1.4 trillion yuan. The quality and efficiency of development was both improved. In 2015, industrial value added (IVA) ratio was 25.4%, net profit margin was 6.3%, and new product sales accounted for 30.8% of product sales revenue. 63 high-tech zones achieved revenue of more than 100 billion yuan, and 10 high-tech zones' growth rate topped 20%. As China's economy enters the "new normal" phase, national high-tech zones, especially National Independent Innovation Demonstration Zone, has built upon its past progress to maintain rapid development. Independent Innovation Demonstration Zones of Wuhan East Lake, Hunan-Changsha-Zhuzhou and Chengdu have registered an average annual growth rate up to 30%, which became a major engine for maintaining moderate and fast economic growth.

National high-tech zones continue to develop new-type industrial organizations, actively cultivate new industrial landscape, and comprehensively build high-tech transfer channel and industrialization platform. Emerging industry production capacity and cluster effect are growing. High-tech zones have become the core to support and lead regional industrial structure adjustment. In 2015, 146 high-tech zones reported 31,160 high-tech enterprises, accounting for 40.9% of the national total. National Independent Innovation Demonstration Zone has become an important cradle for the cultivation and development of new industries in China. The innovative industrial clusters such as Zhongguancun's next generation Internet, Shanghai Zhangjiang integrated circuits, Wuhan East Lake optical communications and Shenzhen's communications equipment are already internationally competitive. In cutting-edge key technology development, major products and equipment manufacturing, international technical standards and other aspects, a large number of high-end technology and products have emerged. A number of new economic growth points, growth poles and growth belts are taking shape. Mobile Internet, Internet of Things (IoT), 3D printing, wearable equipment and other new business formats have mushroomed in the high-tech zones and innovation zones. High-performance computers, artificial nonlinear crystals, nano materials and printing, AI robots, Chinese information processing, quantum communication, human avian influenza vaccine, 3G / 4G technology and standards, fuel cell technology and applications have made important breakthroughs, blazing a new path for



China's High-Tech Development Zones and Industries

industrial development.

High-tech zones, with a focus on the human-oriented approach, have continuously optimized innovative environment, gather innovative elements and subjects, enhance innovation efficiency and ability and lead the country in "mass entrepreneurship and innovation". By the end of 2015, out of 17.19 million practitioners from 146 high-tech zones, 52.7% held diploma of junior college and above. High-tech zones bring together 753 universities, 2,415 research institutes, 9,557 technology centers in enterprises, and 788 technology transfer demonstration agencies, achieving over 30% of the country's R&D spending and over 50% of the enterprise invention patents. The number of invention patents in every 10,000 employees here was 8.5 times the national average. High-tech zones have gathered 1,354 science and technology business incubators, and 1,021 makers' spaces. 44% of the registered makers' spaces were headquartered in the zones. In 2015, up to 190,000 new enterprises registered in the high-tech zones.

The land use level of high-tech zones is generally good and the land use structure is relatively reasonable. High-tech zones take lead in the country in terms of land use efficiency, investment intensity and efficiency. They have become pioneering areas and demonstration areas for conservation and intensive use of land. According to the results of 2014 land use evaluation from the Ministry of Land and Resources, the comprehensive Floor Area Ratio (FAR) of the national high-tech zones was 1.00, the industrial FAR was 0.91, and the fixed assets of industrial land are 67.8883 million yuan per hectare. In all kinds of national development zones, it was the highest. Compared with the results of the evaluation in 2012, in the national high-tech area, the comprehensive FAR increased by 0.07, the investment in fixed assets of industrial land by 17.37%, and the income of per unit industrial land by 1.68%. The growth turned out to be marked.

The new central leadership attaches great importance to the development of high-tech zones. During 12th Five-Year Plan, the state leaders paid many visits to high-tech zones and made important instructions. Relying on a number of high-tech zones that are highly representative and comprehensively competitive, the State Council has approved Zhangjiang, Shenzhen, southern Jiangsu and other 15 areas as National Independent Innovation Demonstration Zones. As of October 2016, there have been 17 such zones.

In April 2017, the Ministry of Science and Technology issued *the 13th Five-year Plan of National High-tech Industrial Development Zone*. *The plan is in accordance with the Outline of the 13th Five-Year Plan for National Economic and Social Development, the Outline of the Medium- and Long-term National Plan for Science and Technology Development (2006–2020), the Outline of the National Strategy of Innovation-Driven Development, and the 13th Five-year Plan for National Science and Technology Innovation, putting forward the blueprint for high-tech zones in the future, including: development foundation and situation, guidelines and development goals, nine major tasks, and relevant measures in 3 aspects.*

(Source: MOST, May 9, 2017)



China's High-Tech Development Zones and Industries

❖❖❖ The overall performance of China's high-tech industry

Introduction: In 2016, Institutes of Science and Development, affiliated to Chinese Academy of Sciences, published an article based on a research, which introduces and evaluates the international competitiveness of China's high-tech industry. The article reflects the recent high-tech industry's overall performance, which is reprinted in this paper.

In accordance with the classification standards of National Bureau of Statistics, high-tech industries include pharmaceuticals, aircraft and spacecraft, electronic and telecommunication equipment, computers and office equipment, medical equipment and meters.

1. Outline of High-tech industry

With China's economic development stepping into new normal, China's high-tech industry is slowing down slightly, but still maintains a good momentum of development. Industry scale and profitability are showing rapid growth. Since 2010, China has seen rapid development of high-tech industry and continued increase of industrial concentration. From 2010 to 2014, The revenue from principal business continued to increase from 7.45 trillion yuan to 12.74 trillion yuan, an average annual increase of 14.35%; profits went up from 675.3 billion yuan to 1,218.9 billion yuan, an average annual increase of 15.91%; the average annual number of employees in the enterprise increased from 10.92 million to 13.25 million, an average annual increase of 4.95%. In the meantime, the number of high-tech industry enterprises decreased from 28,189 to 2,739 in 2012, an average annual decrease of 8.02%. The industrial concentration increased rapidly. The average business income of enterprises was 456 million yuan per enterprise, 1.73 times of that of 2010.

2. Labor productivity and profit performance

China's labor productivity is relatively high in high-tech industry, but there is a certain gap compared with the average manufacturing level. In 2014, China's high-tech industry saw revenue from principal business of 961,200 yuan/ (person-year). In the same period the manufacturing industry's revenue from principal business was as high as 1.1312 million yuan/ (person-year). In 2014, computers and office equipment manufacturing sector achieved the highest revenue from principal business, reaching 1.2754 million yuan/ (person-year). It was followed by pharmaceuticals manufacturing, per capita revenue was 1.0813 million yuan/ (person-year); while per capita revenue was relatively low in electronic and telecommunications equipment, medical equipment and meters, aircraft and spacecraft manufacturing, reaching 870.38 million yuan/ (person-year), 862,600 yuan/ (person-year) and 827,900 yuan/ (person-year) respectively in 2014.

Although China's labor productivity in high-tech industry is lower than the average manufacturing level, the industry profitability is strong. In 2014, China's high-tech industry profit tax rate was 9.57%, 1.81 percentage points higher than the average manufacturing level. Among them, profit tax rates of pharmaceuticals and medical equipment and meters were relatively higher, which were respectively 15.95%



China's High-Tech Development Zones and Industries

and 13.36%, 6.38 percentage points and 3.79 percentage points higher than the high-tech industry. Profit tax rates of electronic and telecommunication equipment and aircraft and spacecraft were 8.41% and 8.14%, slightly lower than the average level of high-tech industries. However, profit tax rate of the computer and office equipment manufacturing industry was very low, which was only 5.14%, 4.43 percentage points lower than the average level of high-tech industry.

3. The international trade of high-tech products

In 2013, China's total export of high-tech products amounted to \$660.078 billion, and import amounted to \$557.939 billion, achieving a trade surplus of \$102.139 billion.

The United States, the European Union, ASEAN, Japan, South Korea, India, Russia are major partners for China to carry out international trade on high-tech product. Among them, the United States and the EU are the main export destination. In 2013, China exported \$117.891 billion and \$97.032 billion for high-tech products respectively to the US and EU. China's export and import of high-tech products to the India were \$12.165 billion and \$453 million, with export outperforming import. ASEAN and Korea are major import countries when importing high-tech products. In 2013, China imported \$79.622 billion from ASEAN and \$98.546 billion from Korea. In the same year, China's export to the Japan and the Russia was respectively \$38.697 billion and \$6.406 billion, and import was \$47.485 billion and \$7.508 billion.

4. The technical capacity of high-tech industry

Industrial technology capacity is mainly reflected in three indicators: the key technological level, new product sales rate and new product export sales rate.

In 2014, the sales rate of new products of China's high-tech industry was 25.79%, 13.25 percentage points higher than the average manufacturing level. In the same period, sales of new products were as high as 45.21%, 23.30 percentage points higher than the manufacturing average. Nearly half of the high-tech products were used for export. China's computer and office equipment manufacturing industry had strong development ability for new products, which were mainly for the international market. In 2014, the new product sales rate and new product export sales rate were 23.88% and 77.23%. New product development ability in aircraft and spacecraft was also strong, whose products were mainly for domestic market. In 2014 the new product sales rate and new product export sales rate were 35.70% and 80.51%. However, new product development ability and export were relatively low in medical equipment and meters, and pharmaceuticals. The new product sales rate in 2014 were 15.53% and 14.82%, and new product export sales rates were 8.81% and 17.94%, much lower than the average level of high-tech industry.

If we comprehensively study labor productivity and profitability, international trade and industrial technology capacity, we can see that China's high-tech industry maintains a good momentum of development, and enjoys certain competitive edge in the domestic and international markets. It is noteworthy, however, that China's full labor productivity and industrial technology capacity still need to catch up with the developed countries.

China's High-Tech Development Zones and Industries

5. High-tech industry personnel and R&D input

From the perspective of R&D input, China has higher spending on technology. In 2014, China's high-tech industry R&D personnel ratio was of 4.32%, 2.09 percentage points higher than the average manufacturing level. In the same year, China's R&D input intensity was 1.51%, 0.36 percentage points higher than the average manufacturing level. Specifically, the R&D investment in aircraft and spacecraft was higher. The R&D personnel ratio and input intensity were 9.91% and 6.10% respectively, which is much higher than the average level of high-tech industry. In the electronic and telecommunication equipment, the R&D personnel ratio and input intensity were 4.23% and 1.74% respectively, around the same level as the high-tech industry average. In medical equipment and meters and pharmaceuticals, R&D personnel were 4.68% and 4.65%, and R&D input intensity were 1.30% and 1.24%. However, the R&D spending in computers and office equipment was relatively low, with a 2.98% personnel ratio and 0.60% input intensity, which are lower than the average level of high-tech industry (Table 3).

Table 3 China's high-tech industry technology input indicators (2014) Unit:%

Sectors	R&D Personnel Ratio	R&D Input Intensity
Manufacturing	2.23	1.15
High-tech industries	4.32	1.51
Pharmaceuticals	4.65	1.24
Aircraft and spacecraft	9.91	6.10
Electronic and telecommunication equipment	4.23	1.74
Computers and office equipment	2.98	0.60
Medical equipment and meters	4.68	1.30

Source: National Bureau of Statistics, National Development and Reform Commission, Ministry of Science and Technology. China Statistics Yearbook on High Technology Industry. Beijing: China Statistics Press, 2016.

The article also points out that compared with developed countries, China's high-tech industry R&D spending still lags behind. Data show that in 2009 the ratio of R&D expenditure to Gross Industrial Output Value of high-tech industry in the US was as high as 19.74%. In 2008, the number in Japan was 10.50%. In 2007, ratios of Sweden, Finland, Germany were 13.18%、11.50% and 6.87% respectively. Ratios of the UK, France and South Korea in 2006 were 11.10%, 7.74% and 5.86%. China's R&D expenditure to Gross Industrial Output Value, however, was only 1.51% in 2014, far below the level of developed countries.



China's High-Tech Development Zones and Industries

6. Patent performance of high-tech industry

In 2014, the number of patent applications for high-tech industry in China was 120,077, of which 75,590 patent applications were for electronic and telecommunication equipment, accounting for 62.95% of the total number. Medical equipment and meters, computers and office equipment, and pharmaceuticals held 16,113, 12,088 and 11,514 patents respectively, accounting for 13.42%, 10.07% and 9.59% of the total number. However, in aircraft and spacecraft, the number of patent applications was only 4,772. In the same year, the number of valid patents of China's high-tech industry was as high as 147,927, of which electronic and telecommunication equipment accounted for 105,307 patents, accounting for 71.19% of the total invention patents. Nonetheless aircraft and spacecraft only held 3,485 patents, accounting for 2.36% of the total number.

Internationally, in 2015 China applied for a total of 15,952 patents under *the Patent Cooperation Treaty* (PCT) in the fields of information and communication, electrical machinery, optics, biotechnology, pharmaceutical and transportation. In the same year, the United States and Japan's PCT patent applications were respectively 26,850 and 21,572, which was 1.68 times and 1.35 times that of China's. In particular in the field of electrical machinery, biotechnology, pharmaceutical and other areas, China still has a long way to go to catch up with the United States and Japan.

7. The comparative advantages of high-tech industry

China's comparative advantages in high-tech industry mainly lie in labor cost, industrial scale and product market size.

Low cost labor is still an outstanding advantage for China's high-tech industry. Data showed that in 2012, Germany, France, the United States, Japan, South Korea's manufacturing labor cost were as high as \$45.8, \$39.8, \$35.7, \$35.3 and \$20.7 per hour. However their Chinese counterparts only earned on average 51,369 yuan in 2014, equivalent to an hourly wage of \$3.97, 1/11 to 1/5 that of developed countries.

After years of development, China's high-tech industry has formed a larger scale. In 2014, the revenue from principal business of the industry was 12.74 trillion yuan. Among them, the electronic and telecommunication equipment accounted for half of China's high-tech industry. Computers and office equipment also occupied a large proportion. Those two main sectors totaled 6.76 trillion yuan and 2.35 trillion yuan for revenue from principal business, accounting for 53.06% and 18.45% respectively of the high-tech industry. In the same year, pharmaceuticals achieved 2.34 trillion yuan, accounting for 18.33% in the industry. The sales of medical equipment and meters and aircraft and spacecraft were relatively minor, so the two sectors registered 0.99 trillion yuan and 0.30 trillion yuan, accounting for only 7.78% and 2.38% of high-tech industry.



China's High-Tech Development Zones and Industries

8. Major Conclusions

Based on the research and analysis, this article has drawn the following conclusions on the competitive environment and competition performance of China's high-tech industry.

1. Industry competitiveness is generally good. Technological breakthroughs have already been made in a number of areas.
2. Industry competition has strong potential, but there is still a significant gap with developed countries in technology input and innovation vitality.
3. Industry competition enjoys overall good environment. Innovative development face both challenges and opportunities.
4. Industry competition is gradually increased, while the gap with the developed countries has been narrowed.

(Source: Science and Technology Daily)